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भारतीय मानक
स्वचल वाहन — स्थिर वाहनों से उत्पन्न शोर
मापन पद्धति
(पहला पुनरीक्षण)

Indian Standard

AUTOMOTIVE VEHICLES — NOISE EMITTED
BY STATIONARY VEHICLES — METHOD
OF MEASUREMENT
(*First Revision*)

ICS 17.140.30

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Vehicle Testing and Performance Evaluation Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1982. The standard is now being revised to bring it in line with the procedures outlined in the latest EEC directives. In view of the growing noise pollution, it has necessitated the Government to lay down limits for different categories of vehicles in *Central Motor Vehicle Rules* (CMVR). Hence, the limits are not specified in this standard.

This standard specifies a test method for measuring the noise emitted by stationary road vehicles in use, the noise being measured in proximity to the exhaust and also the noise made near the engine.

The method is intended to check vehicles in service, and also to determine variations in the noise emitted by different parts of the vehicle under test, which can result from:

- a) the wear or abnormal working or modification of certain components, when the defect does not appear by visual inspection; and
- b) the partial or complete removal of devices reducing the emission of certain noises.

These variations shall be determined by comparing the roadside measurements with reference measurements made under similar conditions, for example, during the type approval.

While revising this standard, considerable assistance has been derived from the following documents:

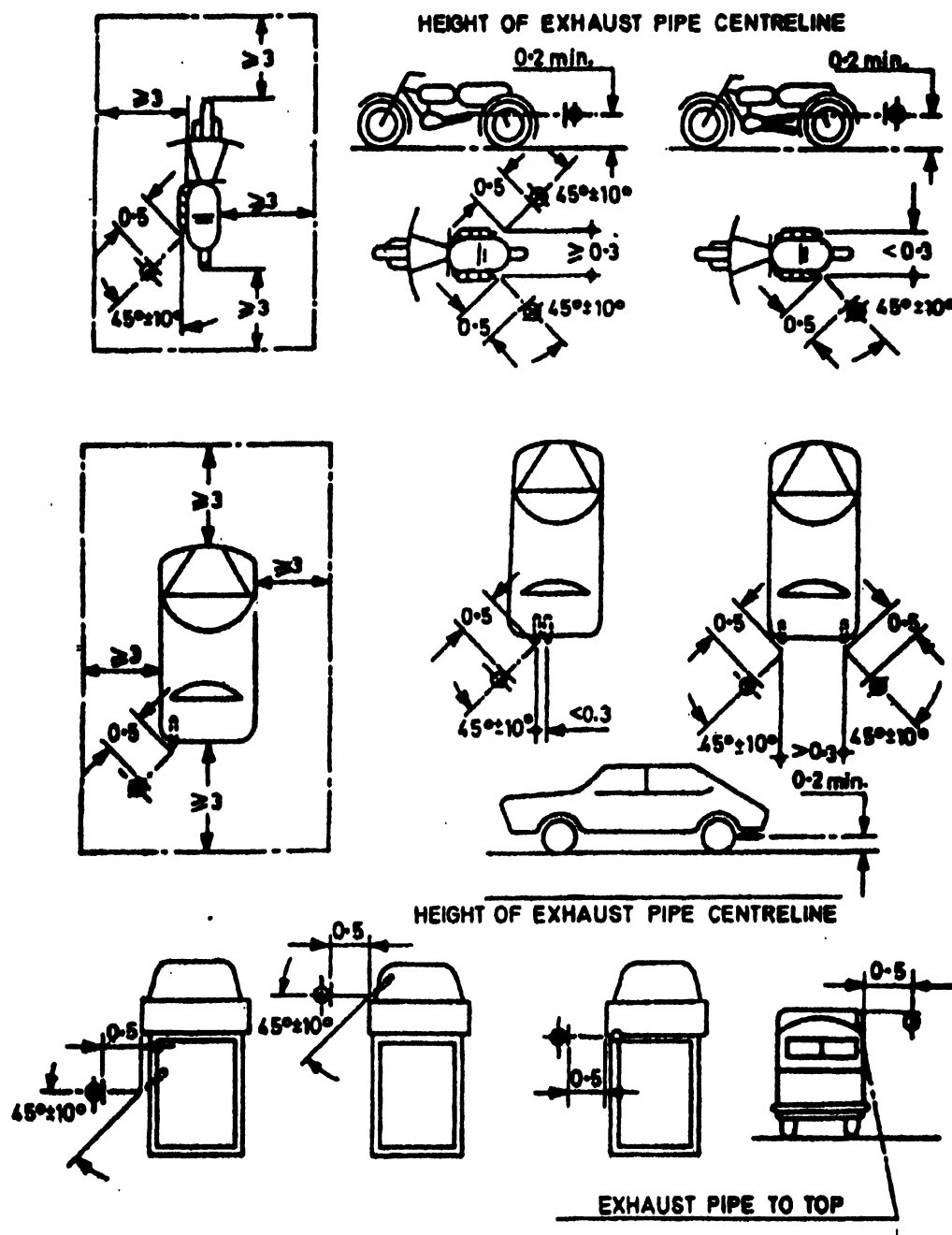
- a) ISO 5130 : 1982 'Measurement of noise emitted by stationary road vehicles — Survey method', issued by International Organization for Standardization (ISO).
- b) 70/157/EEC Amended by directive 96/20/EC.

The values obtained by this method are not representative of the total noise emitted by the vehicles in motion, measured in accordance with IS 3028 : 1998 'Automotive vehicles — Noise emitted by moving vehicles — Method of measurement (*second revision*)'. These should not be used to make comparison between the total noise emitted by different vehicles.

The composition of the committee responsible for preparation of this standard is given in Annex A.

AMENDMENT NO. 1 APRIL 2006
TO
IS 10399 : 1998 AUTOMOTIVE VEHICLES — NOISE
EMITTED BY STATIONARY VEHICLES — METHOD OF MEASUREMENT
(First Revision)

(Page 3, Fig. 1) — Substitute the following for the existing figure:



All dimensions in metres.
FIG. 1 TEST SITE AND MICROPHONE POSITIONS FOR MEASURING EXHAUST NOISE

(TED 4)

Indian Standard

AUTOMOTIVE VEHICLES — NOISE EMITTED BY STATIONARY VEHICLES — METHOD OF MEASUREMENT (*First Revision*)

1 SCOPE

This standard specifies method for measuring the noise produced by a stationary road vehicles other than agricultural vehicles at a readily obtainable site along motor roadways, having specific characteristics.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
3028 : 1998	Automotive vehicles — Noise emitted by moving vehicles — Method of measurement
9779 : 1981	Sound level meters
1885(Part 3/ Sec 1) : 1965	Electrotechnical vocabulary: Part 3 Acoustics, Section 1 Physical acoustics

3 TERMINOLOGY

For the purpose of this standard, definitions of terms given in IS 1885 (Part 3) shall apply.

4 TECHNICAL CHARACTERISTICS OF THE VEHICLE

4.1 Technical characteristics of the vehicle as relevant to noise performance, shall be declared by vehicle manufacturer and shall contain at least the details given in Annex A to IS 3028.

NOTE — If the specifications submitted for complete type approval of a vehicle contain the details given in Annex A of IS 3028, there is no necessity of submitting this information again.

4.2 Modifications/Changes in Technical Characteristics

4.2.1 In case test is conducted for verification of compliance to statutory requirement the following shall be carried out.

4.2.2 Every functional modification pertaining to technical characteristics of noise performance of vehicle declared in accordance with 3.1 shall be intimated to the testing agency. Testing agency may then consider, whether the vehicle with modifications complies with specified performance requirements; or any further testing is required. For considering whether testing is required or not, guidelines given in Annex B of IS 3028 shall be followed.

After successful compliance to the performance requirements, if needed, the earlier test results shall be validated for the modifications/changes also. These conditions are applicable irrespective of any change in commercial name of the model.

5 INSTRUMENTATION

5.1 The sound level meter shall be of the precision type as described in IS 9779 or equivalent IEC publication.

5.2 The measurements shall be made using the weighing network 'A', and the dynamic characteristic 'fast' and 'frontal mode'.

5.3 The sound level meter shall be calibrated and adjusted according to the instrument manufacturer's instructions or with a standard sound source (for example, a pistonphone) at the beginning and at the end of each series of measurements.

5.4 If the errors of the sound level meter obtained from these calibrations change by more than 1 dB during a series of measurements the test shall be considered invalid.

NOTES

1 The sound level meter shall be calibrated at an interval of not more than two years for compliance with IS 9779 or equivalent IEC publication.

2 If a windscreen is used, it shall be of the type specified by the instrument manufacturer suitable for that particular microphone. It shall be ascertained from the manufacturer that the use of the windscreen does not influence the accuracy of the sound level meter detectable under the ambient conditions of test.

5.5 A revolution counter external to the vehicle shall be used, with an accuracy of not less than 3 percent for engine speed measurement.

6 TEST SITE REQUIREMENTS

6.1 To reduce the influence of the surroundings on the noise measurements, a test site complying with the requirements specified in 5.1.1 to 5.1.3 shall be used.

6.1.1 Every open space shall be considered as a suitable test site, if it consists of a flat area made of concrete, asphalt or hard material having a high acoustical reflectivity, excluding compressed or other earth surfaces. In that space a rectangle may be traced whose sides are at least 3 metres from the extremities of the vehicle and inside of which there is no noticeable obstacle. The vehicle in particular shall be at a distance not less than one metre from a pavement edge when the exhaust noise is measured and no significant obstacle shall be situated within 3 metres of the microphone.

6.1.2 With the exception of the observer and driver, no person whose presence influences the meter reading shall remain in the measurement area during the test.

6.1.3 The measurements shall not be made in adverse weather conditions. Care shall be taken that gusts of wind do not distort the results of the measurements. It is recommended that tests should not be made if the wind speed at microphone height exceeds 5 m/s.

7 AMBIENT NOISE AND WIND INTERFERENCE

The ambient noise (including the wind noise) at each measuring position shall be at least 10 dB less than the levels measured during the test.

8 TEST

8.1 Number of Measurements

8.1.1 At least three measurements shall be carried out at each measuring position. The measurements shall be considered valid if the range of three measurements made immediately one after the other is not greater than 2 dB. The arithmetic mean value given by these three measurements shall constitute the result.

8.2 Positioning and Preparation of the Vehicle

8.2.1 The vehicle shall be located in the centre of the test area, with the gear in neutral and with the clutch engaged.

8.2.2 Before each series of measurements the engine shall be brought to its normal operating temperature.

8.2.3 In the case of a two wheeler having no neutral gear position, measurements shall be carried out with the rear wheel raised off the ground.

8.3 Measurement of Noise in Proximity to the Exhaust (see Fig. 1)

8.3.1 Microphone Position

8.3.1.1 The height of the microphone above the ground shall be equal to that of the outlet pipe of the exhaust gases, but in any event shall be limited to a minimum value of 0.2 m.

8.3.1.2 The microphone shall be pointed towards the orifice of the gas flow and located at a distance of 0.5 m from the latter.

8.3.1.3 Unless otherwise indicated by the manufacturer of the sound level meter, its axis of maximum sensitivity shall be parallel to the ground and shall make an angle of $45 \pm 10^\circ$ with the vertical plane containing the direction of the gas flow on both sides.

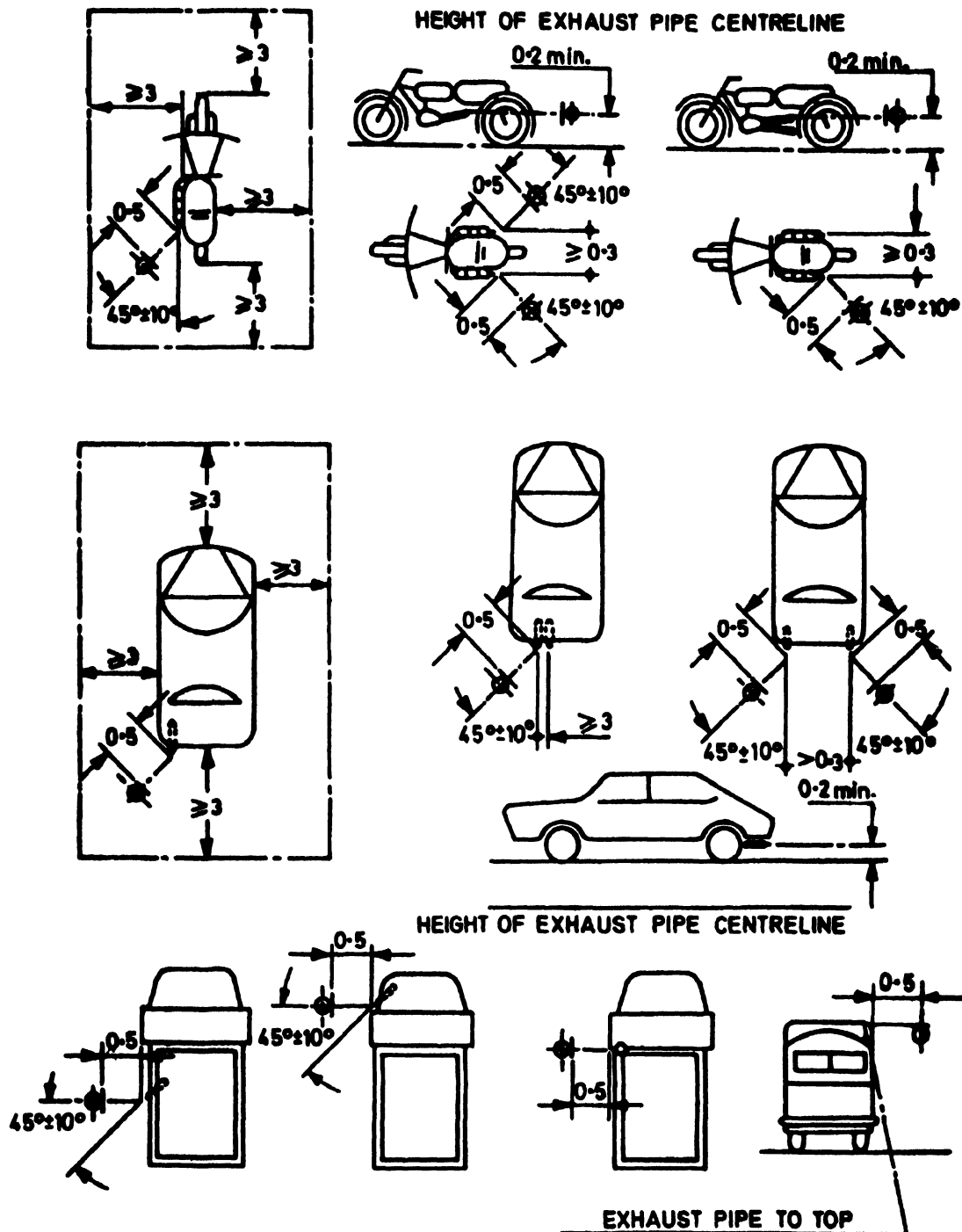
8.3.1.4 In relation to this plane, the microphone shall be placed towards the external side of the vehicle, as shown in Fig.1.

8.3.1.5 In the case of a vehicle provided with two or more exhaust outlets spaced less than 0.3 m apart and connected to a single silencer, only one measurement shall be made; the microphone position shall be related to the outlet nearest to the external side of the vehicle or, when such outlet does not exist, to the outlet which is the highest above the ground.

8.3.1.6 For vehicles with a vertical exhaust, the microphone shall be placed at the height of the exhaust outlet, oriented upwards and with its axis vertical. It shall be placed at a distance of 0.5 m from the side of the vehicle nearest to the exhaust.

8.3.1.7 For vehicles provided with exhaust outlets spaced at or more than 0.3 m apart, one measurement shall be made for each outlet as if it were the only one, and the highest level noted.

8.3.1.8 When the vehicle design is such that the microphone cannot be placed according to Fig.1 because of the presence of obstacles being part of the vehicle (for example, spare wheel, oil tank, battery), a figure clearly showing the place chosen for the microphone shall be drawn when the measurement is carried out. As far as possible, the microphone shall be placed at a distance greater than 50 cm from the nearest obstacle and its maximum sensitivity axis shall be oriented towards the exhaust gas orifice at a place which is the least marked by the above mentioned obstacles.



All dimensions in metres.

FIG. 1 TEST SITE AND MICROPHONE POSITIONS FOR MEASURING EXHAUST NOISE

8.3.2 Engine Operating Conditions

8.3.2.1 The engine speed shall be stabilized at one of the following values:

a) For two and three wheeled vehicles:

S/2, if $S \geq 5\,000$ rev/min, or
3 S/4, if $S < 5\,000$ rev/min, and

b) For other vehicles : 3 S/4.

where S is the engine speed at which the engine produces its maximum power as indicated by the manufacturer.

8.3.2.2 The throttle shall rapidly be returned to the idling position. The sound level shall be measured during the entire operation consisting of a short period of above constant speed and through deceleration period. The highest sound level reading shall constitute the test value.

9 TEST REPORT

The test report shall contain the following information:

- a) A reference to this standard;
- b) The vehicle model/registration number type tested;
- c) The test site, ground conditions and weather conditions;
- d) The measurement instrumentation (including windscreen, if used);
- e) The location and orientation of the microphone;
- f) Engine operating speeds used for the tests;
- g) The A-weighted sound pressure levels determined by the tests;
- h) A-weighted sound pressure levels of the background noise at each measuring position; and
- j) Any abnormal conditions.

ANNEX A**(Foreword)****COMMITTEE COMPOSITION****Automotive Testing and Performance Evaluation Sectional Committee, TED 8***Chairman*

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